Abdominal Incisions for Operations on the Colon and Rectum

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• The magnitude of extirpative operations of the colon and rectum, advanced by improved supportive measures, may be increased by decreasing the extent of transverse abdominal incisions.

The right colon can be removed with facility through a transverse incision across the left upper abdomen.

A left upper transverse incision, plus either an oblique or a Cherney incision, is preferable to a long vertical incision.

DURING THE PAST TWO DECADES there has been a gradual but progressive shift from multiple-stage procedures to one-stage operations for extirpation of the colon and rectum. Such progress is not attributable to greater surgical skill, but is a result of the rapid advance in the knowledge and management of shock, fluid balance, chemical homeostasis, nitrogen balance, intestinal decompression, anesthesia and, to a lesser extent, chemotherapy and the antibiotics.

When confronted with the task of removing the colon, or the colon and rectum, surgical judgment in the choice of operative procedure may be the most important factor in the achievement of low mortality and decreased morbidity. Each patient must be considered individually and many factors weighed. The age and general condition, the pulmonary and cardiac status and the estimated native resistance must be balanced against such considerations as the gravity of the disease and the risk of anesthetizing and operating two or three times as opposed to once. In considering the physiologic aspects of surgical trauma,[4] the bodily changes in surgical convalescence,[5] and the metabolic effects of anesthesia,[3] one must conclude that a one-stage operation is the procedure of choice. Only when the life of the patient would be unduly jeopardized by a one-stage operation should the procedure be carried out in two or more stages.

Since the colon winds its way around the periphery of the peritoneal cavity, or at least seeks out the corners thereof, a major consideration in one-stage extirpative operations is the choice of the abdominal incision, or incisions. Mobilization of the splenic flexure of the colon necessitates an incision fairly high in the left upper quadrant of the abdomen. Anastomosis to the terminal sigmoid colon or upper rectum, and abdominoperineal proctectomy require an incision extending to the pubis. The surgeon must choose between single or multiple incisions. A single vertical incision from the costal margin to the pubis will provide adequate exposure for total colectomy. Such an incision is justifiable in operating on patients injured in war, particularly in hospitals close to the combat line, for usually the exploration of the entire peritoneal cavity is necessary, and speed is vital, since the patient often is bleeding and in shock. This is not the incision of choice, however, in the performance of elective operations.

The argument dealing with the relative merits of vertical and transverse incisions has been treated amply in the literature and will not be discussed in detail here except to emphasize that the transverse abdominal incision provides the following advantages:

1. Less postoperative pain
   a. Decreased postoperative shock
   b. Less sedation
2. Less sedation
   a. Decreased incidence of nausea
   b. More rapid return of normal peristalsis
   c. Earlier oral feeding
   d. Relatively unimpaired cough reflex
3. Deeper respiration, and more frequent turning in bed
   a. Decreased incidence of pulmonary complications
4. Earlier ambulation
   a. More rapid convalescence
5. Decreased tension on wound edges
   a. Retention sutures not required
   b. Primary union
6. Decreased incidence of dehiscence
7. Decreased incidence of incisional hernia.

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Unprejudiced reflection, physiologic consideration and time will eventually prove the advantages of the transverse abdominal incision. The powerful muscles of the abdomen are the oblique and transverse muscles. They not only initiate the act of turning in bed, but are the main propulsive force of turning. A normal person turns in bed many times each night, and after operation a patient should turn even more often. Why, then, should a vertical incision across the line of this preponderant muscular pull be made?

The "mystery" of the continued widespread use of the vertical abdominal incision is not at all mysterious. It is used by a majority of the leading surgeons of today because they used it in their youth, and are loath to change. Furthermore, most prominent surgeons of today neither make nor suture the abdominal incision—their assistants do. In the past, a surgeon who made a long transverse abdominal incision would have been accused of a lack of knowledge of anatomy. In the future, the routine use of the vertical abdominal incision can only be explained by a lack of appreciation of the function of the abdominal musculature.

Because the colon traverses the margins of both the right and left sides of the peritoneal cavity, it would appear that an incision across the entire abdomen would be required for total colectomy. Such is not the case. The colon lying in the right side of the cavity may be removed with ease through a transverse incision across the left upper quadrant of the abdomen. Obviously, such an incision would not be employed unless the transverse colon and splenic flexure were to be extirpated.

After division of the gastrocolic omentum, the middle colic artery and vein are divided and ligated at their base. With the transverse colon held in the left hand, the surgeon can push slightly opened scissors around the lateral margin of the hepatic flexure and ascending colon, dividing the peritoneum with facility. Thereupon, the entire right colon and terminal ileum are delivered through the left upper quadrant incision, and the left colic and ileocolic vessels may be clamped and divided at their base in full view. The technical ease is due to the fact that the operator is merely "unwinding" the embryologic rotation of the colon. The left transverse incision adequately exposes the midline origin of the arteries concerned and, in fact, encourages a more thorough resection of the mesentery. Suffice it to say that the surgeon who removes a colon through this incision for the first time will be amazed by the ease of the delivery of the right colon.

The pelvis cannot be adequately exposed by a transverse incision. However, an oblique incision (as advocated by Waugh[8]) provides satisfactory exposure for operation on the sigmoid colon and rectum, and it has the advantages of the transverse incision, as it parallels the nerve supply and is almost in line with the major muscular pull. This incision extends from a point superior and medial to the left anterior superior iliac spine to the right of the center of the symphysis pubis. The left rectus muscle is transected as in the case of transverse incisions.

The Cherney incision[1] is excellent, particularly when maximum exposure is desirable in operations on the rectum or sigmoid colon in obese patients or in infants. A curved incision is made 2 cm. above the symphysis pubis. The anterior rectus sheaths and the aponeuroses of the external abdominal oblique muscles are divided in line with the incision. The tendinous insertions of the rectus abdominus muscles are divided flush with the superior surface of the symphysis pubis, and the peritoneum is divided in line with the incision. The incision is below the panniculus of fat in the obese, an obvious advantage. In closing this incision the tendinous terminations of the rectus muscles are sutured to the anterior rectus sheaths with interrupted mattress sutures of cotton or silk, immediately superior to the symphysis pubis.

A modified or "half-Cherney" incision provides adequate exposure for the majority of operations on the sigmoid colon and rectum. This is made and sutured in the same manner as the Cherney incision, except that it is not extended to the right, and the tendinous insertion of only the left rectus abdominus muscle is divided.

The Cherney incision, while providing the greatest exposure, has two disadvantages. It takes 15 to 20 extra minutes to make and suture the incision. In the presence of massive pelvic contamination, when wound infection is anticipated, this incision should not be used, for if it should break open as a result of infection, there is not enough tissue below the incision to permit the placement of through-and-through sutures for secondary closure of the dehiscence.

The oblique and the Cherney incisions possess the physiologic advantages of the transverse incision, and either one is preferable to a vertical incision. Actually, only the lower half of a vertical incision provides exposure of the lower pelvis, whereas the full length of the oblique or Cherney incision is utilized for exposure.

Incisions for ileostomy or permanent colostomy deserve consideration. The incision for ileostomy should be made by a muscle-splitting technique either through or lateral to the right rectus muscle. A button of skin should be excised to eliminate the V-shaped gap that results on either side of the stoma if a straight incision is used, and also to lessen the risk of stenosis. Likewise, either a button of the an-

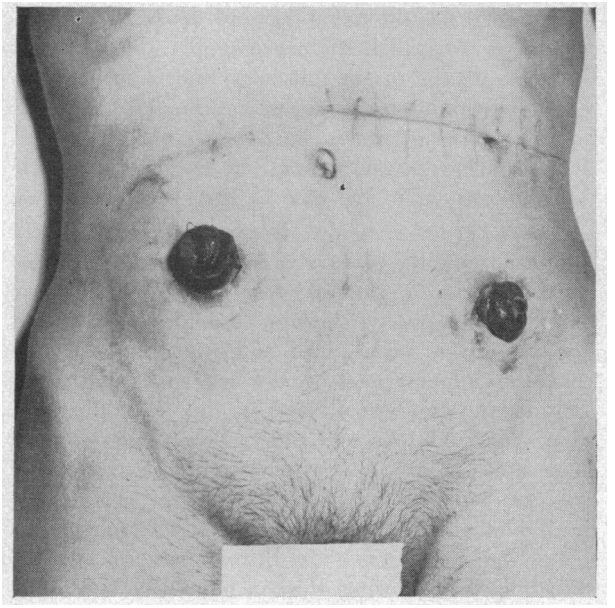

Figure 1.—Left transverse incision—in this case for total colectomy except sigmoid colon.

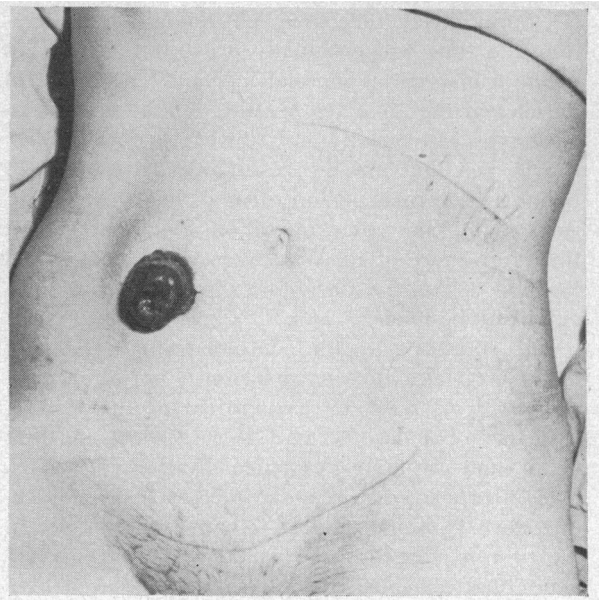

Figure 2.—Left upper transverse incision and "half Cherney" incision—here used for total colectomy and abdominoperineal proctectomy.

terior rectus sheath, or of the aponeurosis of the external abdominal oblique should be excised. Crile and Turnbull,[2, 7] have made an outstanding contribution to the surgical management of ileostomy, calling attention to the fact that serositis of the projecting portion of the uncovered ileum always occurs, resulting in contiguous peritonitis of the intraperitoneal terminal ileum, mesenteric lymphadenitis, segmental adynamic ileus and obstruction. They noted that the ileostomy does not function properly until the mucosa has everted, has covered the serosa of the projecting ileum and has become attached to the skin—a process requiring approximately six weeks. Hence they advocated immediate "surgical maturation" of the ileostomy. To do this, the ileum is delivered two inches beyond the skin and is held in place by a suture through its terminal mesentery, the peritoneum and the posterior rectus sheath. The external layers of the terminal inch of ileum are excised, leaving only the mucosa. This mucosa is everted over the remaining projecting inch of ileum and sutured to the skin around the periphery of the stoma. A temporary ileostomy bag is immediately applied. Important details of the application and subsequent management of the ileostomy bag have been described by Turnbull.[7] The author has utilized this procedure in two instances since the presentation of the paper by Crile and Turnbull,[2] and the results have been gratifying.

The technique of creating a single-barrel colostomy following abdominoperineal proctectomy differs in two ways from that used in an ileostomy. Since a permanent colostomy bag is not used, projection of the colon beyond the skin is not necessary or desirable; and since muscular control of the stoma is desirable, it should be made through a muscle-splitting incision lateral to the rectus sheath. Buttons of skin are excised from the skin and the aponeurosis of the external abdominal oblique. The colon should be sutured to the skin around the circumference of the stoma with numerous closely placed interrupted sutures of fine catgut. This procedure, to quote Smyth,[6] "violates most of the principles of colon surgery—but it works." Actually, it fulfills the very important surgical principle of not

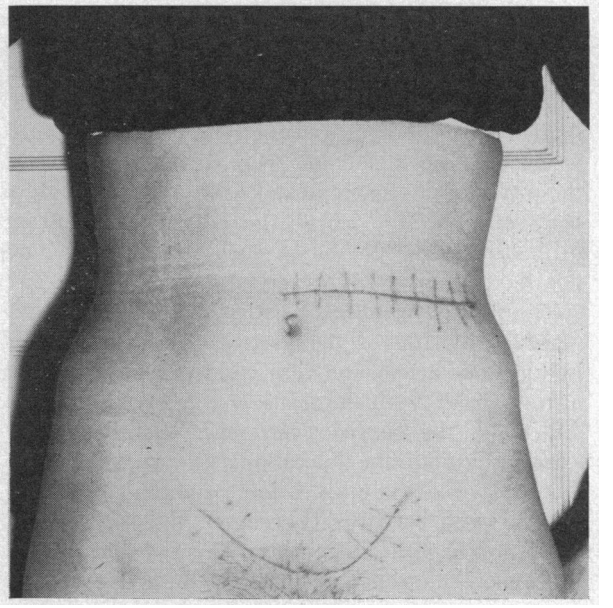

Figure 3.—Left upper transverse and Cherney incisions for total colectomy and ileoproctectomy.

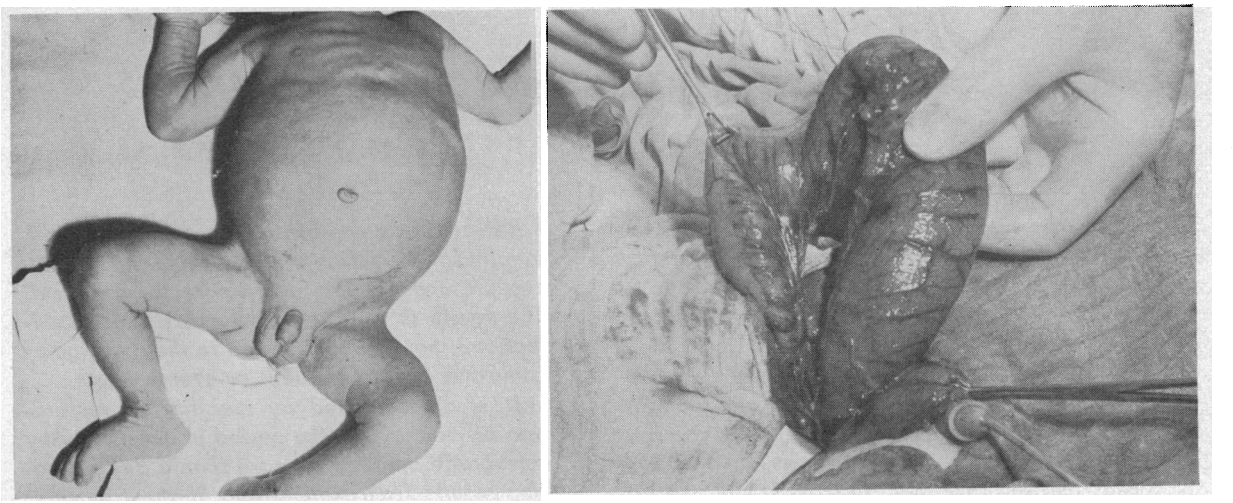

Figure 4.—Use of Cherney incision in abdominoperineal correction of congenital recto-urethral fistula and megasigmoid. Good exposure was obtained despite greatly enlarged sigmoid colon.

permitting naked serosa to project beyond the skin. The author has used this technique in nine instances since receiving advice from Smyth, and the resulting colostomies have been the best that he has ever achieved. The colon is pulled through the abdominal wall in the usual manner with a Payr clamp, and isolated. The oblique or Cherney incision should be sutured and completely isolated from the colostomy, preferably by rubber dam and cement. The colon, held with no tension, is divided at the level of the skin and sutured to the skin. This procedure provides a colostomy that does not retract, prolapse, or stenose.

The following abdominal incisions for operations on the colon and rectum are recommeded:

1. Right transverse incision, one centimeter above umbilicus.
   Right colectomy.
2. Left transverse incision, two to five centimeters above umbilicus.
   Left colectomy.
   Transverse colectomy.
   Total colectomy, except sigmoid colon (Figure 1).
3. Left upper transverse incision, plus either an oblique or a Cherney incision (modified to "half Cherney" incision in thin patients).
   Total colectomy and abdominoperineal proctectomy (Figure 2).
   Total colectomy and ileoproctostomy (Figure 3).
4. Oblique incision, or a Cherney incision.
   Abdominoperineal proctectomy (Figure 4).
5. Button excision of skin and aponeurosis of external abdominal oblique, with muscle-splitting of internal oblique and transverse abdominus muscles (or muscle-splitting of rectus abdominus when indicated for proper fitting of ileostomy bag).
   Ileostomy (Figures 1 and 2).
   Colostomy.
   Mucous fistula (Figure 1).

REFERENCES

1. Cherney, L. S.: A modified transverse incision for low abdominal operations, Surg., Gyn. and Obs., 72:92, 1941.
2. Crile, G., Jr., and Turnbull, R. B., Jr.: The mechanism and prevention of ileostomy dysfunction. Read before the American Surgical Association on April 29, 1954. In press, Ann. Surg.
3. French, A. B., Barss, T. P., Fairlie, C. S., Bengle, A. L., Jr., Jones, C. M., Linton, R. R., and Beecher, H. K.: Metabolic effects of anesthesia in man, Ann. Surg., 135:145, 1952.
4. Hardy, J. D., and Ravdin, I. S.: Some physiological aspects of surgical trauma, Ann. Surg., 135:345, 1952.
5. Moore, F. D.: Bodily changes in surgical convalescence, Ann. Surg., 137:289, 1953.
6. Smyth, C. M.: Personal communication.
7. Turnbull, Rupert B., Jr.: Management of ileostomy, Am. J. Surg., 86:617, 1953.
8. Waugh, J. M.: Personal communication.